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IN MEMORY OF THE SPACE SHUTTLE "CHALLENGER", AND THE
SEVEN MEN AND WOMEN WHO DIED - JANUARY 28, 1986

CoCo RTTY Part VI

CONTEST RULES AND REGULATIONS

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CoCo RTTY PART VI

BY Mark Spenser, WABSM/DA10Y
POB 5889
APO New York, NY 09012

The final installment? You bet! In this last of the series of articles I will discuss the software of the CoCo RTTY demodulator. The discussion will not be a line by line breakdown of the programs, that type of documentation is available with the programs (if you decide to request them from Dee). I would just like to conclude with a short description of what is available and touch on using ROM chips with the CoCo.

The program that supports the CoCo RTTY demodulator is relatively short and straight forward. The following steps give just the briefest overview of what occurs:

1. The interrupt vectors are set; the screen is cleared; and a prompt asks for unshift on space.

2. Upon receiving a Non Masked Interrupt (NMI) signal from the UART, the program checks for ASCII or RTTY character (MSB set or reset) and jumps to the appropriate portion of the program.

3. If RTTY:

- First checks for valid Baudot character, then for blanks, carriage returns, figures, letters, bells (non-printing characters).

- Converts RTTY to ASCII format by index register/data table techniques.

- Checks for line location to prevent word split.

- Prints the character to screen.

I have prepared the program in two forms; first, a tape loader that loads the machine code into memory from cassette tape and basic; second, assembler code with documentation to CLOADM into RAM or modified and burned into ROM. The programs are all position independent (except a few low level RAM locations just above video RAM required for registers) and can be located as the programmer desires.

I preferred the programming option of burning the program into ROM and have it auto execute to preclude tape loading and "EXEC" commands. I burned the program into a 2716 EPROM and mounted the chip on the demodulator board. CPU address lines were brought out through the demodulator/computer interconnecting ribbon cable. The data lines were already available and used by the

demodulator (see circuit diagram figure 9). The ROM data lines are connected to the CoCo. When the ROM is not selected, the data outputs are High-Z and will not interfere with CPU operation.

When the CoCo addresses memory locations normally occupied by a game cartridge (above HEX C000) the CTS signal enables the ROM's plugged into the game port. This signal is tied to the chip enable line of the 2716 and enables the EPROM during program execution. The final connection I found desirable is to interconnect pins 7 and 8 on the CoCo game port. This enables Auto execute of the program burned in ROM (as long as it starts at HEX C000).

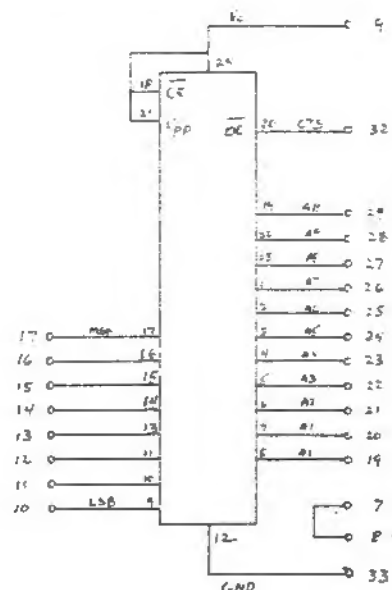
CONCLUSION

Well, that's it. If you've followed along this far, you've been exposed to many practical applications of electronics and digital techniques that ranged from OP Amp theory to Active Band Filters, on to digital signal processing and finally machine language programming.

I hope that this series has given you a little insight as to what occurs in the marvelous "black Boxes" available for RTTY, makes them a little less mysterious and hopefully stimulated some of your own ideas on how to apply the circuits that I presented in your own projects.

I sincerely hope that the series has been worthy of the space in your magazine, RTTY JOURNAL, I would appreciate your comments, questions, criticisms and suggestions.

73's de Mark, WABSM/DA10Y





DX

JOE WOOD, AJBX

PSE 64

LAUREL, MS 39440

Also from VE7VP, a report on other activity. Tom says that the New Zealanders have a weekend net on 3.545 which is readable in British Columbia at around 0730 UTC. He further states that a number of AH-KH 6's have come up to 80 meters for skeds and made QSO's. AH6CS was his first ARQ. Tim is hoping to make a VK ARQ contact before the season is over.

Hello to all!

Do you need new countries? Need to rework some of those that did not QSL the first time? Or perhaps need something a bit challenging and invigorating? Look no further 'cause the answer lies with your participation in the upcoming RTTY WORLD CHAMPIONSHIP CONTEST. This event, sponsored by the RTTY JOURNAL and 73 Magazine, will be held on February 22, 1986 from 0000 to 2400Z. Complete details are featured in last month's issue of "THE JOURNAL". Many countries are represented in this contest and will be there for the eager contesters and DX'er. Hope to work each of you!

EXPANSION OF THE RTTY SEGMENT

Lots of comments coming in on this one! There is still time to be heard with the cut-off date of March 1 still in effect. Let me know your feelings on this most important issue. Write, write, write.....do it now!

DXCC

Heartiest congratulations go out to N5DSK on his recent RTTY ARRL DXCC. Arden goes in with 105 countries. Good job my friend!

WHAT'S HAPPENING?

WTDA reports A4XFW will be going to Belize in mid-January and become V3BC.

T3OAT returning from a trip to England should be back in harness at this time. From AGWN.

If you have had problems with QSL's from UD5NG, try the WA1ZFS route. It worked for W5HEZ although a bit slow.

From the Pacific Northwest, VE7VP reports JA's are available in limited numbers. He has worked two on 3.574 MHz (ARQ). This frequency is the top limit for them on eighty meters.

HEARD/WORKED

CALL	FREQ.	TIME	DATE	MODE
FY5AU	14090	1133	Jan 05	Baudot
A4XJQ	14081	1340	Jan 04	ARQ
UK3KP	14099	1323	Jan 04	Baudot
RA3UN	14094	1310	Jan 03	Baudot
OX3BA	14099	2046	Jan 01	Baudot
5N8ZH	14095	1945	Jan 01	Baudot
TR8DX	14092	1202	Jan 01	Baudot
OD5NG	14081	1338	Dec 31	Baudot
DF9FA/4S7	14086	1256	Dec 30	Baudot
UB5JZ	14096	1354	Dec 29	Baudot
UZ3AYR	14094	1343	Dec 29	Baudot
A4XJX	14076	1240	Dec 29	FEC
5B4MD	14073	1235	Dec 29	FEC
DA10P/FY	14084	2200	Dec 29	Baudot
YU3EA	14093	1157	Dec 29	Baudot
JA1BYL	14075	2300	Dec 27	ARQ
CE2US	14082	2200	Dec 27	Baudot
5V5TS	14087	1150	Dec 27	Baudot
A4XKB	14076	1223	Dec 26	ARQ
KC2OU/V2A	14082	1830	Dec 25	Baudot
5V7JS	14076	1852	Dec 25	ARQ
EA9JE	14082	1731	Dec 25	Baudot
EA9NN	14088	2000	Dec 25	Baudot
PZ5ES	14094	1501	Dec 25	Baudot
Y04KCA	14093	1222	Dec 25	Baudot
FM5BW	14087	1300	Dec 24	Baudot
YS7OB	14098	2158	Dec 24	Baudot
VU2YY	14085	1228	Dec 23	Baudot
Y39TU	14094	1900	Dec 22	Baudot
9K2LA	14093	1331	Dec 22	Baudot
TZ6FE	14083	2315	Dec 21	Baudot
ISWIGV	14093	1200	Dec 21	Baudot
UR1RXD	14088	1222	Dec 21	Baudot
OK1JKM	14090	1430	Dec 21	Baudot
SV0AC/SY9	14076	1152	Dec 21	ARQ
ZL2BKY	3577	0729	Dec 20	AKQ
JR3TMW	14077	2445	Dec 20	ARQ
ZS6BZY/P4	14077	1045	Dec 19	ARQ
EA1QJ	14076	1830	Dec 18	ARQ
EA4BW	14078	1705	Dec 18	ARQ
ZL2BKY	14073	1735	Dec 17	ARQ
T32AB	14079	0022	Dec 16	ARQ
ZS6BMT	14078	1917	Dec 15	ARQ
PJ3SF	14090	2258	Dec 15	Baudot
LX2BC	14082	1400	Dec 15	Baudot
HP1XLH	14090	2251	Dec 14	Baudot

DX COLUMN CONTINUED

A22BW	14090	2232Z	dec 14	Baudot
ZF1JC	14085	1258	dec 14	Baudot
PJ2MI	14078	112U	dec 14	Baudot
AH6CS	3627	0710	dec 13	ARQ
A4XFW	14080	1220	dec 10	FEC/ARQ
UA3TT	14081	1220	dec 09	Baudot
OD5IG	14092	1135	dec 08	Baudot
EA9IB	14078	1730	dec 07	ARQ
9Y4NW	21084	1622	dec 07	Baudot
HC5CG	14093	1229	dec 07	Baudot
9H4C	14090	1203	dec 06	Baudot
ZS6UP	14076	1857	dec 05	FEC
ZS6ACS	14077	1810	nov 25	ARQ
AH6CS	3640	0730	nov 20	ARQ
ST2SA	14074	1800	nov 09	ARQ/BBS
ZS3NH	14075	1951	nov 01	ARQ

.....and many others!

TRI-MONTHLY QSL INFORMATION

As promised, in the November DX column, there follows an updated list of stations with their last known addresses. If you have any information on the listed stations or on additional stations, you are invited to send it directly to me. My address is listed at the beginning of this article.

STATION	QSL TO
A4XJQ	G4YTI
A35RS	ZL4DO A92BE POB 26803, Manama, Bahrain.
A92DU	PE1BSX.
BY1PK	PUB 6106, Beijing, P.R.C.
BY5RA	PUB 730, Fuzhou, P.R.C.
CN8BX	Dr. Guy, Aladiesh des Yeux Ave., Mohamed 5, Marrakech.
C21FS	POB 83, Republic of Nauru.
C30LBM	EA5AGY.
C30LCS	EA3TJ.
C31NP	EA3BNX.
C53CL	EA8ZZ.
D44BC	POB 36, Mindelo, Cape Verde Isle.
DA1OP/FY	POB 999, Cayenne.
EA8YV	POB 258, La Laguna, Tenerife.
EA8ZO	Romantica 1, #30, Los Realejos, Tenerife.
EA9MY	POB 412, Melilla.
EA9NN	POB 419, Melilla.
EL2AT	OE3NH.
F6AEV	K2HG.
FK8FL	POB 4561, Noumea, New Caledonia.
FM7BH	F2BS.
FM7BK	POB 152, 97202 Fort de France Cedex Martinique.

FM7BX

F08DP	E. Zysset, 205 Eastern Ave. St. Cloud FL 32769
F08KS	N7RU.
FY/DA1OP	PUB 5252, Pirae, Tahiti.
HC1BW	POB 999, Cayenne.
HL1EJ	KTIN.
HL2AMO	POB 6152, Seoul 100, Korea.
HL9AV	1455-33 Nam Ku Juan Dong, Incheon, Korea (POB 44).
HR5SB	EUSA-G3-FD, APO, San Francisco, CA 96301.
HV2VO	WB0MZB
HZ1AB	I0AOF.
JY9IU	K8PYD.
K4UZL/KP4	HB9AHA.
KA0CVR/SV	Tony Snow, POB 3022 NCS, FPO Miami, FL 34051.
KC2OU/V2A	WB4TDB
KD9P/NH2	VOA, POB 19, FPO Miami, FL 34054.
KG4DX	B. Winters, 68 Betel Palm, S. Finegyn, NCWP, FPO San Francisco, 96630.
KE5IZ/PJ3	WB2CPV.
K8CV/HC8	WA5ZVZ.
NP4CD	KBCV or KBLJG.
OD5NG	PUB 3861, Bayman, PR 00620.
OE2SNL	WA1ZFS (this route produced results for W5HEZ!)
OE3HGB/YK	5760 Saalfelden, Hans-Hunt-Gasse 6, Austria.
OX3FG	POB 999 AAA, 1014 Vienna, Austria.
PJ8UQ	PUB 177, 3920 Julianehab, Greenland.
P29JS	W3HNK.
SV0AC/SV9	POB 515, Konedobu, Papua, New Guinea.
SV5TS	WB4GCP.
SW2ON	POB 251, Rhodes, Greece 85100.
SW2SU	J. Spanoudakis, Vas Olgas 122, Thessaloniki.
TG9VT	POB 10483, Thessaloniki, Greece.
T12SPA	W3HNK.
T19TTY	POB 7547, San Jose, Costa Rica.
TR8DX	WB4UBD.
TZ6FE	WA4VDE.
T30AT	DL4BC.
T32AB	G4GED.
UB5MDI	N7YL.
U05OK	POB 3EEEEET, Kommunarsk, 349100, USSR.
U05OWS	UT5RP.
UT5RP	UT5RP.
V2AW	POB 300, Odessa, Ukraine, USSR.
VK9ZW	PUB 229, Antigua, W.I.
VP2MIX	VK6YL.
VQ9DX	HB9AHA.
WH8AAJ	S. Bowen, VP-9 WC660 AIMD, FPO San Francisco, CA 96601.
XT2AU	POB 973, American Samoa, 96799.
YB3CBF	WA1ZEZ or DJ5RT.
	POB 75, Malang, Indonesia.

Courtesy AREWISE (Australian RTTY Bulletin)

There were a few quite surprized faces around on the bands that day as Syd, VK2SG, connected to Neil, VK2ZYI. This was the case as Syd, is a very well known advocate for his exploits on

'ZL Kiwis enjoy chomping on excellent quality
fine braised venison.'

PACKET EVOLUTION



ANOTHER BREAKTHROUGH FROM AEA

Packet + RTTY= Pakratt™ PK-64.

If you've read about packet, or are already into it, you know how exciting it is. With the hot new Pakratt PK-64 we've just brought a new dimension to packet. The Pakratt PK-64 is a complete, fully assembled and tested packet radio controller which, together with a Commodore 64 or 128 computer, can convert your shack into a packet operations center. And we've included a new version of our advanced MBA-TOR™ software to make it the first packet controller with AMTOR, Baudot, ASCII and Morse. But an even more exciting part of the Pakratt controller is its great price.

Incredibly Simple To Set Up

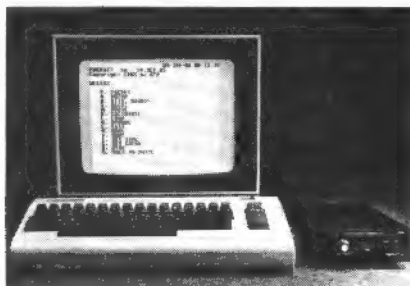
Just plug the Pakratt controller into the C-64's game cartridge slot, add a mic connector for connecting to your particular

transceiver, and you're set.

If you're anxious to try it out, our new "quickstart" manual section can get you on the air in under ½ hour.

Simply Powerful

The versatile Pakratt controller shows messages and connect status simultaneously on your Commodore with a unique split-screen display. And it lets you



PK-64 shown with HF modem option.
Computer not included.

send letter-perfect text from the text editor software while monitoring incoming messages. The 20K byte QSO buffer stores more than 20 video screens of text! Disk commands let you save

specific operating parameters for quick set-up for emergency services, clubs, and multiple frequency use. And the Pakratt controller's standard, TAPR style modem gives you 300 and 1200 baud operation with great HF/VHF performance.

We can't possibly list all of the important features of Pakratt here. But the absolutely best part of the Pakratt PK-64 is that it's at your dealer now. So stop reading, run down to your local dealer, and check Pakratt out. Because the real challenge will be to find one after the other hams see it.

Pakratt PK-64. Packet Power from AEA. At amateur radio dealers everywhere.



Advanced Electronic Applications, Inc.
P.O. Box C-2160
Lynnwood, WA 98036-0918
(206) 775-7373
Telex: 6972496 AEA INTL UW



BY: Dick Uhrmacher, KØVKH
212-48th Street
Rapid City, SD 57702

MSO'S

Hi Gang! Another year has rolled around, and it looks like a good one from this authors viewpoint. We start the New Year out with some good news! Dick Schulte, WD4MTC, one of the steadfast MSU SYSOP's, recently had some very serious chest surgery, and we're very happy to report that Dick is at home again, recuperating from that surgery. Dick's struggle with medical problems had been a long and frustrating one for him and his family but, it appears now that he's well on his way to feeling much better. We all wish Dick a very speedy and complete recovery, and we'll look forward to seeing that booming MSO signal of his when he's ready to resume that service.

And, good news from "South of the Border" as well. John Troost, TG9VT, was undergoing some very rigorous tests at Massachusetts General Hospital during the Christmas Holidays, and we're happy to report that John and his family are now back in Guatemala, and he's recovering in good shape. John reports that his doctors found his difficulty, and that it was much less serious than at first thought, and that medication will keep him in good shape. We're very happy for both Dick and John, and suspect that they both had some "heavy weight" help in their corner during their trials!

MSO SOAPBOX

Although this author understands from the "League Lines", in the January 1986 issue of "QST", that the ARRL feels that Amateur Radio will not be unduly effected by the now pending "Communications Privacy Act of 1985", being considered by the U.S. Congress, I have some gut feeling that where there's smoke, there's fire! Amateur Radio has for years been the target by several groups of individuals who would like to see their line of thinking imposed on Amateur Radio. We've been quite successful in the past in defeating these unwanted, (and I might add, un-needed) changes, and I do not think that we should drop our guard at this time.

For those of you who might not be familiar with this "Privacy Act", I encourage you to find a copy of the January 1986 issue of "WORLD RADIO", which does an adequate job of laying out the problem for Amateur Radio in detail. Basically, it appears that the Cellular Telephone Industry Association, (CTIA), is attempting to have Senate Bill S-1667, and House Bill HR-3778 amended with some very restrictive legislation, which may have deleterious effects on Amateur Radio. These twin bills in the U.S. Congress were originally written to establish and enforce laws concerned with "computer hacking", but, lobbying efforts by the CTIA have evidently been successful in amending the original intent of these bills.

From the preliminary information I have obtained, it appears that the CTIA wants this legislation written in a manner which will provide them the opportunity to advertise cellular phones, (car phone service) as being "secure communications". Much like the phones in our homes and businesses are. Far from being the truth, of course, we all know that Radio communications, unless encrypted, are open to intercept by one and all who have that communications capability! And, there is where the crux of the matter for Amateur Radio lies. If the CTIA has its way, it appears they want some restrictions on Amateur Radio autopatches, phone patches, digital data, (RTTY, Packet, SSTV, etc.), only so that they may advertise the "big lie", (i.e., that their cellular communications are secure)!

Far from just effecting those who like to 'eavesdrop' on various communication services via scanners, continuous tuning receivers, etc., the CTIA proposals would make even "inadvertent" intercept of cellular communications illegal, and subject to fines and penalties. Since there are literally millions of older TV sets and VCR's in the public domain, capable of receiving UHF channels 70 thru 83, (cellular communications are in the 800 MHz area), this intercept capability is widespread, (even though the inherent diversity receiving/transmitting of the "cellular" concept will most likely make intercept of these signals sporadic at best).

In my correspondence with the South Dakota Congressional delegation in Washington concerning this subject, I'm told that S-1667 is presently before the Senate Judiciary Committee on Patents, Copyrights and Trademarks, and that no hearings have been held. At the risk of "crying wolf", I suggest to all readers that they immediately contact their own elected representatives in the to page 9 please

Nations' capitol, Washington, D.C., and that they make it known to them, in no uncertain terms, that they object to the CTIA's lobbying efforts, WITH RESPECT TO AMATEUR RADIO! Section 705 of the Communications Act of 1934 is explicit in its requirements concerning the interception and divulging of private communications, and we do not need further amplification, modification or legislation just to perpetuate a lie by the CTIA!

Write a personal letter to your Senator or Congressman. Don't work up lists of signatures, as they only count as one letter. Outline your feelings on the subject in laymans terms, and ask that they carefully review S-1667 and HR-3378, and that they delete reference to Amateur Radio where ever they are included in these bills. Sure it may take ten minutes of your time, but, it also may keep Amateur Radio as the public service we know it today.

The next meeting of Congress will be Thursday, January 30th, 1986, on this subject.

GENTLEMAN'S RTTY AGREEMENT:

As much as I respect the thoughts and deliberations of my fellow RTTY'ers, I see again some suggestion that MSO's or CBMS's be placed in some "sub-band", in order that they not interfere with some other RTTY pursuit, (DX'ing, rag-chewing PIX), etc., ad nauseum! And again I must strongly protest, and point out that what is really needed is some simple, straight forward, and disciplined operating techniques by ALL who use this mode. In my twenty-five years of Amateur Radio operations, I have never known a mode where QRM is not a factor. Concurrently, I have never known a mode where knowledge and use of good operating practices has not minimized QRM. Utilization and placement of MSO's or CBMS's is certainly no different. Those of us who use twenty meters routinely for our RTTY activities know, for instance, that if we operate near 14.090 KHz. that we will most likely either interfere with RTTY PIX QSO's, or they interfere with our QSO's; or, that if we QSO on 14.100 KHz. we interfere with Beacon activities; or if we QSO on 14.103 KHz. we either interfere with Packet activities, or they interfere with us. Utilizing MSO's/CBMS's is certainly no different. However, the secret to co-habiting with MSO's and CBMS's is for ALL operators to make their presence known by simple

asking if the frequency is in use, before activating the MSO, or starting the QSO. There will always be periods when one side of a QSO or MSO operation is not heard by some distant station, and inevitable QRM will result. However, what mode is there that inadvertent QRM doesn't exist? To suggest that MSO's or CBMS's be shunted off to some sub-band, just so that DX-ing, rag-chewing, etc., can have clear frequencies in which to operate, suggests that MSO's and CBMS's are second class citizens, a thought which does not set well with this author! Co-operation, good operating techniques and knowledge of the various modes is the answer, not restrictive partitioning of our already limited bands!

MSQ RAMBLINGS

Don't forget to register early for the RTTY Dinner to be held during the Dayton Hamvention. Reservations can be left with KOVKH, K4KOZ or W4LUF. ---Brownie, K5FL, has reported difficulties with the digital display on his TS-940S, and wonders if anyone else has had similar problems? ----The N1API MSO (Meriden, CT), is back up and running after some equipment repairs. ---- The WD4MTC remains off the air while Dick recovers from recent surgery. ---- The W9CD MSO is temporarily off the air while Clark visits in Oklahoma.

That's it for this month gang. Have fun on RTTY, and I'll see you on the MSO's!

DE: Dick, KQVKH

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Sorry to bring this issue of the RTTY JOURNAL to you so late, but the U.S. Post Office is the culprit this time. Dick, KOVKH mailed his column to the RTTY JOURNAL office around the 1st of January....It still has not arrived. I telephoned Dick in panic to please send out another copy of his column and it made it here on January 27th.

While typesetting the column and 'filling in' here and there to complete the issue, we learned of the explosion on board the space shuttle Challenger. So looking up at my "VIP" QSL card bulletin board, I spied the QSL card I received from Houston and decided to put it on the cover. Hope you all approve. 73 de DEE, N6ELP.....

PG8-Utilizing 'FSK' with the Kenwood TS-930S and 'HAL' ST-6000.

The following information pertains to interfacing the 'FSK' input of Kenwood TS-930S, to the RS232C output of the 'HAL' ST-6000 demodulator. This allows keying of the FSK portions of the TS-930S, with the added benefit of allowing utilization of the 500 Hertz C.W. filter in the receive mode.

It should be noted that the Kenwood TS-930S 'FSK' input requires the use of a 'TTL' level signal, the maximum voltage level of five (5) volts permitted. Consequently, any RS232C level signal must first be 'conditioned', prior to being input into the TS-930S 'FSK' port. The following information will provide for FSK keying of the TS-930S, from the 'HAL' ST-6000 demodulator:

1. Connect a 4.7 volt Zener diode from pin one (1) of plug J-5 (RS232/MIL188 I/O) on the ST6000. This diode should be connected so that the anode is connected to pin one (1), and the cathode (Banded end) connected to pin five (5). (ground).
2. Connect a shielded wire from pin one (1) of J-5 (RS232 I/O on back of ST-6000), to the center conductor of a 'RCA' plug.
3. Connect the shield (or ground wire) from pin five (5) of J-5 (RS232 I/O on back ST-6000), to the 'barrel' of this same 'RCA' plug.
4. Plug the 'RCA' connector into the 'FSK' port on the back of the TS-930S.

This completes this modification, and any output from the ST-6000 should cause a corresponding FSK signal to be generated by the TS-930S.

PG9-Conversion of the 'INFO-TECH' M-300-C RTTY Keyboard from regular to 'inverted' FSK keying, do the following:

1. Locate IC-15, (4011B).
2. Remove this I.C. from the socket and bend lead number four (4) up, and re-insert the I.C. into its' socket, being careful that all leads are inserted into the socket, (except pin four).
3. Locate IC-15 on the bottom (non-component) side of the circuit board.
4. Using a small soldering iron, and a small piece of hook-up wire, solder a jumper between

pins four (4) and five (5) of IC-15. This completes the conversion.

PG10-Yaesu FT-757GX modifications for continuous transmit capability.

Modifying the Yaesu FT-757GX transceiver so that it will transmit in any area that it will receive is very simple. Once this modification is completed, users should be VERY careful, as the transceiver will transmit at any frequency displayed by the digital readout, and of course, can end up with an 'out of band' citation quite easily!

1. Set the transceiver in it's normal operating position, and remove the screws holding the heat sink, (top of rig).
2. Swing the heat sink up out of the way.
3. Facing the front of the rig, note that there is a vertical circuit board in the right-front corner of the rig. Locate a bundle of wires immediately behind this circuit board.
4. You will find a small switch located UNDER this bundle of wires. By placing this switch in the other position, this transceiver will now transmit in any area it capable of receiving.

PG11- TS-930S Modifications for continuous transmit capability.

The following modifications will enable the Kenwood TS-930S to transmit outside of Amateur Radio bands, (M.A.R.S., C.A.P., W.A.R.C., etc). For those who have the TS-930S service manual, these modifications are shown by 'dotted lines' from I.C.'s 21, 22 and 23, on the "PC board view", page 36.

1. unplug the A.C. power cable.
2. Remove the transceiver top cover (8 screws).
3. Remove the 4 screws from the speaker mounting and top panel assembly.
4. Swing the assembly away and unplug the red/black battery backup leads from the digital unit (X54-1680-00).
5. Carefully add a wire jumper from:
 - A. I.C. 21, pin 12 to I.C. 11, pin 9.
 - B. I.C. 22, pin 12 to I.C. 12, pin 9.
 - C. I.C. 23, pin 12 to I.C. 24, pin 8 (ground).

Page 10 to page 12 please

UNIVERSAL PACKET CONTROLLER model PK-80



\$219⁹⁵ Suggested
Amateur Net Price

The AEA model PK-80 is a wired, tested, and calibrated version of the famous TAPR TNC-2 and comes with a one-year conditional AEA warranty.

You can interface the PK-80 with any ASCII terminal or a personal computer and standard terminal software. The PK-80 is loaded with all the latest AX.25 version 2.0 software and advanced packet hardware circuitry that makes the TNC-2 the newest benchmark for comparison.

Compare the following as representative of the advanced new features relative to the competition.

- Hardware HDLC for full duplex
- True Data Carrier Detect (DCD) for HF operation
- Operates with 300, 1200, 2400, 4800, and 9600 baud terminals
- Five front-panel status indicators
- Multiple connect
- Connect check (poll final bit) fully implemented
- Connect AUTO response message
- Only three commands necessary for making standard contacts
- 82 software commands possible for the most demanding requirements

Prices and Specifications Subject to Change Without Notice or Obligation.

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(206) 775-7373

AEA BRINGS YOU THE
BREAKTHROUGH

RESULTS OF THE EUROPEAN DX-CONTEST (WAEDC) 1984 RTTY CONTEST (just received them, believe it or not!)

1. D44BC	354,637	17. Y021S	34,650	33. YU8FR	3,024
2. 9H1EL	221,904	18. Y22UL	27,342	34. Y32ZF	2,622
3. SM4CMG	178,227	19. DF5BX	23,140	35. Y04BXX	2,600
4. SM6ASD	141,778	20. EA6LH	14,008	36. EA3AEN	2,544
5. JB5MDI	139,084	21. UV3FD	13,860	37. PA3DBS	2,160
6. IC8POF	138,972	22. OH2BDN	12,816	38. F68VB	1,160
7. EA3BHA	129,299	23. AA2Z/1	11,820	39. OK2BJT	810
8. UT5RP	128,952	24. VK2BQS	10,944	40. YU2CB	714
9. OZ1CRL	105,192	25. PT2BW	10,430	41. DJ2YE	672
10. 4Z4KB	99,360	26. LZ2JA	9,555	42. JA7KM	288
11. EA5CVR	80,784	27. SM6BUV	7,740	43. HL1QT	266
12. OE2SNL	51,153	28. F6AU	7,020	44. Y62QN	96
13. K6WZ	50,634	29. DL3HAH	6,603	45. DK5JK	72
14. DJ1XT	48,848	30. W3KV	6,120	46. SP3IOE	44
15. DF3CB	39,500	31. DK7GL	4,050	47. W2GKZ	08
16. AA4DV	39,336	32. JR2CFD	3,363		

single operators above-multi-operators below

1. LK1KDP	386,628	6. G3UUP	96,180	11. G4VSZ	6,776
2. HG5A	345,800	7. OK3RJB	78,676	12. Y82ZN	3,403
3. HB9Z	215,070	8. OK3KGI	71,944	13. UZ0LWW	1,904
4. UZ3AYR	119,784	9. UZ0CWA	30,672	14. JA6YDH	196
5. ED6MOX	101,520	10. UZ3MWC	16,830	15. JA7YGW	91

SWL -

1. FE 3700	45,649	5. U05-039077	6,976
2. DE1GMH	35,376	6. UA3-170-47	1,760
3. NI 4483	21,756	7. FE 41758	1,092
4. OK1-20677	20,829	8. Y2-8742/F32	528

Check logs DE1KWD, SM6EZI, OK1MP, SP2UU, SM3MID, YO3AC, HA4YF, EA7EVD, UK-21478.

Trophy winners: 9H1EL, Europe; K6WZ, North America; PT2BW, South America; 4Z4KB, Asia; D44BC, Africa; VK2BQS, Oceania...Multi-ops: LZ1KDP, Europe; UZ0CWA, Asia....SWL: FE 3700, Europe.... and.... Special category: DE1GMH, and OK1-20677....

November 8 and 9th, 1986. 0000 GMT Saturday to 2400 GMT Sunday will be the dates for the next WAEDC European RTTY DX Contest. Put it on your calendar now.

RULES: Bands: 3.5 - 7 - 14 - 21 - 28MHz.

Classifications: Single op-all band; Multi-op-single transmitter; Multi-op/single transmitter stations are only allowed to change band one time within a period of 15 minutes. A quick band-change and return for working new multipliers is allowed.

Rest Period: only 36 hours of the 48 hours are permitted for single op stations. The 12 hours of non-operation may be taken in one, but no more than three periods at any time during the contest and have to be marked in the log.

Exchange A contest QSO can only be established between a non-European and a European station. Exchange the usual five or six

HITS &

MISSSES

GEORGE HANSON, MAISON
14215 Pecan Park Lane Space 73
El Cerrito, CA 92023



The computer revolution started nearly half a century ago. The advancement by virtue of a simple physical phenomenon, streams speeding electrons. The streams of electrons can start or stop other streams of electrons. In short electrons can act as a switch.

The first generation of this principle was used with tubes, then transistors and finally assemblages of thousands of transistors known as silicon chips. This is why computers run on electricity which is simply billions of electrons in motion. All computers, be they personal ones or government systems, rely on digital switching by streams of electrons.

Today we are on the verge of making the big step from electrons to protons. The attraction is that photonic computers work faster, thousands of times faster, than the best possible electric ones, which will make it possible to process data in remarkable new ways.

Dr. Alan Huang, director of the newly formed optical computing department at A T & T's Bell Laboratories, believes the Bell team can create, within one year, a prototype and within five years, a working full scale model. He refers to it as a real number cruncher.

Bell Labs has a history of innovation, having invented the transistor, the maser, the laser and many devices that have advanced the art of manipulating light to man's advantage.

The key to creating an optical analog of the transistor, which is still the muscle behind computations. It would switch light off and on in a way similar to how a transistor switches electricity. Transphasors, already a reality, would lie at the heart of optical computers. The transphasor is nothing more than a flashing switch.

The advantages of computing with light is... raw speed. Under ideal conditions, electrons can move close to the velocity of light. The real world tells us that silicon chip electrons are slowed to less than one percent of light's velocity. Even in the miniature world of microelectronics, this means that the majority of a computers time is spent, not crunching numbers, but waiting for electrons to move from one place to another. The current state of the art dictates that most increases in speed and power have come from shrinking the distance between electronic parts at a machines heart, which cuts the idling time. However, this approach is at its limits.

The laggard pace of many electrons is in contrast to the photons who always travel at the speed of light, (about 186,000 miles per second). The switching action can be up to 1,000 times faster than electrons.

I will close out my column for the month and continue in next months column the interesting story on light computers.

I hope the new year is starting out well for everyone out there....I re-injured my back lifting a microwave oven, so it's back to square one for me.

50 long for now.....George, WA6COW

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KOVKH TECHNICAL LIBRARY CONTINUED

For simplicity, these jumpers may be 'tack soldered' to the component side of the board. Be very careful not to create solder bridges, or drop solder or wire shards into the radio!

This completes the modification. Reassemble the unit, being certain not to pinch any leads under the speaker bracket assembly. Be CAREFUL not to transmit out of the Amateur Bands, unless you are authorized to do so!

PG 12- Enabling the ten Hertz readout on the Ken-wood TS-930S.

The following procedure will enable the "ten Hertz" readout on the Kenwood TS-930S transceiver. It should be noted that extreme caution should be used in making this modification, as an inadvertent or wrong wiring change could have serious complications.

to page 15 please

EUROPEAN DX-CONTEST WAEDC CONTINUED

digit serial number starting with 001. W/K stations in addition give their state (e.g. 599011 MA).

Points: Each QSO counts 1 point. A station may be worked once per band. Each confirmed QTC - given or received - counts 1 point (see below).

Multipliers: The multiplier for non-European stations is determined by the number of European countries worked on each band. Europeans will use the last ARRL countries list. In addition, in each call area in the following countries will be considered a multiplier: JA, PY, VE, VO, VK, ZL, ZS, UA90. Each W/K-state will be considered a multiplier, but not W/K call areas. The multiplier on 3.5 MHz may be multiplied by **four**. The multiplier on 7 MHz may be multiplied by **three**. The multiplier on 14/21/28 MHz may be multiplied by **two**.

Scoring: The final score is the total QSO points plus QTC points multiplied by the sum total multipliers from all bands.

QTC-Traffic: Additional point credit can be realized by making use of the QTC traffic feature. A QTC is a report of a confirmed QSO that has taken place earlier in the contest and later sent back to a European station. It can only be sent from a Non-European to a European station. The general idea being that after a number of European stations have been worked, a list of these stations can be reported back during a QSO with another station. An additional 1 point credit can be claimed for each station reported.

a. A QTC contains the time, call and QSO number of the station being reported (i.e. 1300/DA1AA/134) This means that at 1300 Z you worked DA1AA and received number 134. b. A QSO can be reported only once and not back to the originating station. c. only a maximum of 10 QTCs to a station is permitted. You may work the same station several times to complete this quota, Only the original contact, however, has QSO point value. d. keep a uniform list of QTCs on a separate sheet if they clearly indicate the station who sent the QTCs. 3/7 indicates that this is the 3rd series of QTCs sent and that 7 QSOs are reported.

Contest awards: Certificates to highest scorer in each classification in each country, reasonable score provided. Continental leaders will be honored. Certificates will also be given to stations with at least half the score of the Continental leader.

Disqualification: Violation of the rules of this contest, or taking credit for excessive duplicate contacts will be deemed sufficient cause for disqualification. The decision of the contest committee is final.

Logs: It is suggested to use the log sheets of the DARC or equivalent. Send large size SASE to get the wanted number of log and summary sheets (40 QSOs or QTCs per sheet). Use a separate sheet for each band. All entrants are required to submit cross-check (dupe sheet) for each band on which they worked more than 200 QSOs. For each duplicate contact that is removed from a log by a checker, a penalty of three additional contacts will be crossed out.

Special RTTY Regs: contacts between all continents and also one's own continent are permitted. Multipliers will be counted according to the European and ARRL countries list. QSO as well as QTC-traffic with one's own country (district) is not allowed. SWLs apply to the rules accordingly. Deadline: December 15, 1986.

European Country List: C31 - CT1 - CT2 - DL - EA-
EA6 - EI - F - FC - G - GD - GL - GJ - GM - GM
Shetland - GU - GW - HA - HB - HBO - HV - I -
IS - IT - JW Bear - JW Spitsbergen - JX - LA -
LX - OE - OH - OH0 - OJO - OK - ON - OY - OZ -
PA - SM - SP - SV - SV5 Rhodes - SV9 Crete - SV
Athos - T77/M1 - TA European part - TF - UA136
- UA2 - UA Franz-Josefs Land - UB - UC - UN/UKIN-
UO - UP - UQ - UR - Y22-99/DM - YO - YU - ZA -
ZB2 - 1A0 - 3A - 4U1 Geneva - 4U1 Vienna - 9H1.
Mailing address: WAEDC-Committee, Postbox 1328,
D-8950 Kaufbeuren, West Germany.

DARC "CORONA" 10 METER RTTY CONTEST 1986 RULES

SCHEDULE: 1st test-Saturday March 1,1986 1100-1700z. 2nd test-Sunday May 4th,1986, 1100-1700z. 3rd test-Saturday September 6th,1986 1100-1700Z. 4th test Sunday November 2nd,1986 1100-1700Z. Band: recommended range of 10 meter Amateur Radio Classes: A=single op; B=Multi-op/single TX; C=SWL printer.

Contest call: "CO CORONA TEST"

Exchange: RST/QSO #/Name. US stations will give, additionally, their state.

POINTS: Each complete RTTY-QSO counts for one point. Each station has to be contacted only once.
Multipliers: Use the latest WAE- and DXCC-list. Count each VE/VQ/VK call area and each different US-state as a separate country.

Scoring: Total QSO points times total multipliers

Logs: It is recommended to use the official log forms, which are obtainable from the manager, send SASE. Logs should contain: name, Call and full address of participant/class/time Z/exchange and final score. SWLs apply according to the rules.

Deadline: Each entry to be received within 30 days after the respective test date.

Contest manager: Heinz Moestl, DE8BUS, POB 1123,
D-6473 Gedern 1, West Germany.

Prizes: Appropriate awards to the leading stations per each class.

CLASSIFIED ADS

30 words \$3.00. additional words 5 cents each - Cash with copy. Deadline 1st of month for following month.

MICROLOG 6800 ATR with Basic, Mailbox, App.Mod #2 in original box, best offer. 904/829-5003 days. Larry, KD4IA.

PACKET/ASCII/BAUDOT/CW for IBM-PC and equals. Split screen and buffers beaucoup. Bigger and better than ever! SASE to: Emile Alline NE5S, 773 Rosa Ave., Metairie, LA 70005.

ROBOT 800 TERMINAL, Mint condx. recently factory serviced, \$200. Kenwood TR-750U 2 meter, Midland 13-509 220 rigs, best offer. A. Lakritz, KB9DD, 319 Bird Rock, La Jolla, CA 92037. 619/459-4401.

FOR SALE: NEW MODEL 32 Manuals 3 volume set. 1, 2, & Parts. \$20 per set. 33 manuals \$25 set. 33 prints \$10. 8 level or 5 level tape \$1 per roll. 8 level fanfold tape \$3 per box. Roll paper \$2 per roll. 2 spool ribbons for models 28,32,33,35 etc, \$1 each. Model 32 KSR's with Private Line Electronics (UCC 5) \$75 ea. ASR's \$90 each. Units are tested working. Sold AS IS complete less stand. Stands available at \$10 ea. RS232 interface for model 33's (UCC6) \$75 ea. Male to male or female to female gender changes \$12 each, 25 pin through put. New 0-300 baud modems (direct connect) Ans & orig. modes RS232 \$69 ea. 9 1/2 x 11 paper (tearaway perfs) 3300 forms to box \$34 per box. 8 1/2 x 11 thermal rolls for T.I. Silent 700's series \$4 per roll. Good used muffin fans removed from equipment cleaned & tested \$6 each. Various paper & ribbon supplies & TTY parts available. Please call reference your needs. All items FOB: TRAM TELETYPEWRITER SERVICE, 50-0 Corbin Ave. Bayshore, NY 11706. 516/242-5011. Terms PREPAID & shipping charges will be COD.

HENRY RADIO IS OVERSTOCKED with used and demo RTTY and SSTV gear: 1KL 100W TU's, new, \$325! HAL ST-6000 \$550, DS-3100 \$1450, new CWR 6850/AMTOR 10A combo for \$995, used only \$750; AEA micro-patch \$115; used HAL CT-2200 W/KBD \$550; used 12" green monitors \$99; Robot SSTV, 400, 450C, 800C, used, call for prices. Ukidata and Panasonic printers, Mitsubishi P50-U video printer \$399; used HAL Amtor ARQ-1000 \$499. Call George, AB6A at Henry Radio, Los Angeles, 1-800/421-6631 or 213/820-1234.

TELETYPE EQUIPMENT-Warehouse full of Model 28,33, and 35 KSR's and ASR's, TD's, typing reperfs, mod kits and parts. Collected over 15 years. Must vacate by June 30th - \$5,000 for the lot. Also RTTY demodulators and video RTTY equipment. Send SASE for complete list and prices. Lawrence R. Pfleger, K9WJB, 2600 S. 14th Street, St. Cloud, MN 56301. PH. 612/255-9794.

NEWS-NEWS-NEWS-Amateur Radio's Newspaper "WORLD-RADIO". 1 year subscription is \$9. Send to: WORLD RADIO, 2120 28th St, Sacramento, CA 95818.

RTTY PAPER AND SUPPLIES-8 1/2" wide, 4 1/2" dia. rolls, \$5 each, reperf tape 11/16", \$2.50/roll, 1" \$3/roll. Fanfold paper 8 1/2 x 14 sheets \$25 box. New, heavy inked UPI ribbons, \$2.50 each. Teletype motorized 28/33/35 paperwinders \$60 ea. Spring-wound tape take-up reels \$15 each. Back issues RTTY JOURNAL 1957-1964 \$10 per year. Manuals for Model 15/28/33/35 machines. Gear-shifts for all Model 28 machines. Send SASE for complete list and prices. Lawrence R. Pfleger, K9WJB, 2600 S. 14th Street, St. Cloud, MN 56301. PH 612/255-9794.

HAM RADIO MAGAZINE. The no nonsense state-of-the-art technical magazine. Subscribe now and see for yourself. 1 year \$19.50 in USA. Canada and foreign surface \$21.50. Europe, Africa & Japan area \$28 airmail. Ham Publishing Group. Greenville, NH 03048.

HAL COMMUNICATIONS STRIKES AGAIN! If you have an IBM-PC personal computer, then you want to utilize the new HAL PCI-2000 interface and software to turn it into the ultimate in a computer based RTTY system! Morse, Baudot and ASCII. 103/202 modems, all speeds/shifts, split screen and a host of other features. Write or call Dick, KØVKH DIALTA Amateur Radio Supply, 212-48th St., Rapid City, SD 57702. 602/343-6127. Our prices can't be beat!

WANTED- TELETYPE REPAIR. Parts, unused. Sell gears, parts, manuals, supplies. SASE list. TYPE-TRONICS, Box 8873, Ft. Lauderdale, FL 33310. N4TT 305/583-1340 after 9PM EST.

ROM-116 is now sold by the Martin Co., Box 982, Marysville, WA 98279. Info from W9FPM, Doc.....

ARRL 1986 NATIONAL CONVENTION- September 5,6 & 7, 1986. Now taking advanced registrations. Postmark before April 15,1986 is eligible for both the "EARLY BIRD" and "ADVANCE REGISTRATIUN" prizes. Advance registration is \$7.00 per person. \$10.00 after 8/15/86. Banquet (Prime Rib) \$25.00, Ladies luncheon \$10.00, Friday night Dinner/Dance/Cruise with open bar \$33.00 (1st 100 only) Prices are per person. 18 years and under-no charge for admission at door. Make checks payable to: SANDARC, Inc., POB 82642, San Diego, CA 92138. Meeting site is Town & Country Convention Center. To reserve a room at the Convention site or other San Diego Atlas Hotel call toll free: In California 800/542-6082, USA- 800/854-2608. Ask for ARRL rates. Also discount airline fares may be arranged through the Atlas Hotel Travel Service at the same telephone numbers. Canadians may call 800/854-6742. There is a telex number also to call:695-415. Since I am in charge of all alternative activities at the convention I will see you there. Dee, N6ELP.....

DX COLUMN CONTINUED

YJ8GX	F6GXB
YS1GMV	POB 1557, San Salvador.
ZK1XL	ZK1CG.
ZK2WL	ZL3AFH.
ZL1AMW	House 27, Whakamura Village, Manga- kino, New Zealand.
ZP5JAL	K02A.
ZS3TL	W7PHO.
ZS6APH	WA3HUP.
Z25JS	POB 1194, Harare, Zimbabwe.
3B8FP	IK8DYD.
3X4EX	N4CID.
4U1UN	W2MZV.
4Z4NL	POB 30949, Tel Aviv, Isreal.
4Z4NUT	WB2FTK.
5T5CE	H89BJL.
5T5RG	POB 322, Nouadhibour, Mauritania.
5VBWS	DJ6QT
5W1EJ.	W0WP.
6W1CC	F6CVE.
6W1CK	DL1HH.
6Y5SH	AK1H.
7P8CL	SM5KDM.
8P6JG	WA8IMO.
9H1GD	F. Dramann, 51 Annunciation St., Tarxien, Malta.
9K2LA	POB 3534, Safat, Kuwait.
9X5SP	DL80A.
9Y4GX	W7GVF.

Next month's feature..a new expanded RTTY/
Packet range of twenty meter frequencies for
instant implementation. Join us!

I wish to thank the following for their support in sending along the information that makes this column possible: W1DA, WA8DRZ, AG0N, W5HEZ, K8CV, and VE7VP. Until month, very 73 and the best of DX de Joe, AJ0X.....

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KØYKH TECHNICAL LIBRARY CONTINUED

1. Unplug the A.C. power cord, and remove the transceiver top cover, (eight screws).
2. Remove the four screws from the speaker mounting and top panel assembly.
3. Swing the assembly away and unplug the red/black battery backup leads from the digital unit.
4. Locate I.C. 24. To activate the " 10 Hertz" readout position, you will find an eight-pin "Molex" plug near I.C. 24, (directly between I.C.

24 and the front panel of the TS-930S), that only has seven (7) wires plugged into it. You need to 'ground' the pin that would normally be inserted in pin eight (8). Grounding this pin will activate the ten Hertz position on the readout.

5. Pin eight (8) of I.C. 24 is a good place to run the jumper for a ground connection.

PG13 Enabling eight additional memories, plus scanning feature, TS-930S.

This modification will activate an additional eight (8) memory channels on the second VF0, and activate a feature allowing scanning of the memory channels in each VF0 (16 total).

1. The only parts required are two small SPST switches, to supply a 'ground' to two different pins on the 'digital board'. Mount these two switches inside the compartment housing the battery backup and vox controls. Drill and mount these two switches on the right hand side of this compartment, making sure there is space to activate the switches.

2. One side of each switch must be grounded. Run a wire from the other side of one of the switches to pin five (5) of connector seven (7). This gives you the eight (8) extra memory channels. Next, run a wire from the other switch to pin three (3) of connector eight (8). This will provide the scanning feature. NOTE: connectors seven and eight are located on the lower right handside of the digital board when looking in from the front of the TS-930S. Both pins three (3) and five (5) are vacant prior to this modification.

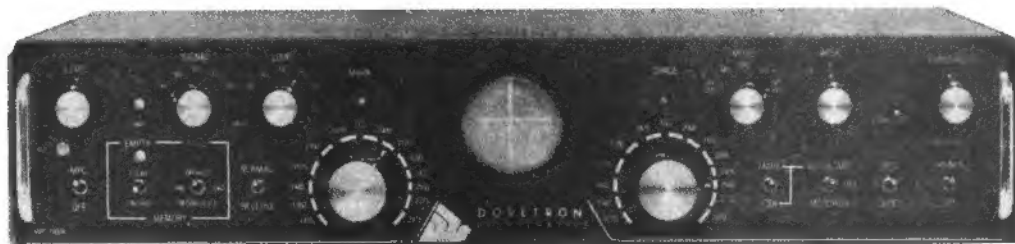
3. After re-assembly, apply power to the TS-930S. Start with both switches in the 'OFF' position. The rig should operate as it did prior to the modifications. Turn "ON" the switch for the extra memory channels. Note that you now have an additional eight memories. Either group of 8 memories can be scanned but NOT at the same time.

4. To start scanning, the VFO/Memory switch must be in the "VFO" position, and the "function" switch in either the "A-R", or "A" position. Turn the toggle switch to start scanning. Turn the other toggle switch "ON" or "OFF" to select either group of memory channels. NOTE: This modification doesn't interconnect with "AMTOR" gear for use in auto-start.

To be concluded in future issue/s of the RTTY JOURNAL. Please note that the RTTY JOURNAL and Dick, KOVKH are not liable for any damages due to the modifications presented here.

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